US010869080B2

(12) **United States Patent**
Horton et al.

(10) **Patent No.: US 10,869,080 B2**
(45) **Date of Patent: *Dec. 15, 2020**

(54) **SERVER FOR PROVIDING TELEVISION AND SYSTEM AND METHOD FOR USE OF SAME**

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(*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 0 days.

This patent is subject to a terminal disclaimer.

(21) Appl. No.: **16/819,127**

(22) Filed: **Mar. 15, 2020**

(65) **Prior Publication Data**

US 2020/0221158 A1 Jul. 9, 2020

Related U.S. Application Data

(63) Continuation of application No. 15/693,821, filed on Sep. 1, 2017, now Pat. No. 10,595,074, which is a continuation-in-part of application No. 15/281,681, filed on Sep. 30, 2016, now Pat. No. 10,547,904,
(Continued)

(51) **Int. Cl.**

H04N 21/426	(2011.01)
H04N 21/234	(2011.01)
H04N 21/643	(2011.01)
H04N 21/443	(2011.01)
H04N 21/44	(2011.01)
H04N 21/231	(2011.01)
H04N 21/442	(2011.01)

(Continued)

(52) **U.S. Cl.**
CPC ***H04N 21/4263*** (2013.01); ***H04N 5/50*** (2013.01); ***H04N 21/23106*** (2013.01); ***H04N 21/23406*** (2013.01); ***H04N 21/4384*** (2013.01); ***H04N 21/44004*** (2013.01); ***H04N 21/4435*** (2013.01); ***H04N 21/44222*** (2013.01); ***H04N 21/64322*** (2013.01)

(58) **Field of Classification Search**
None
See application file for complete search history.

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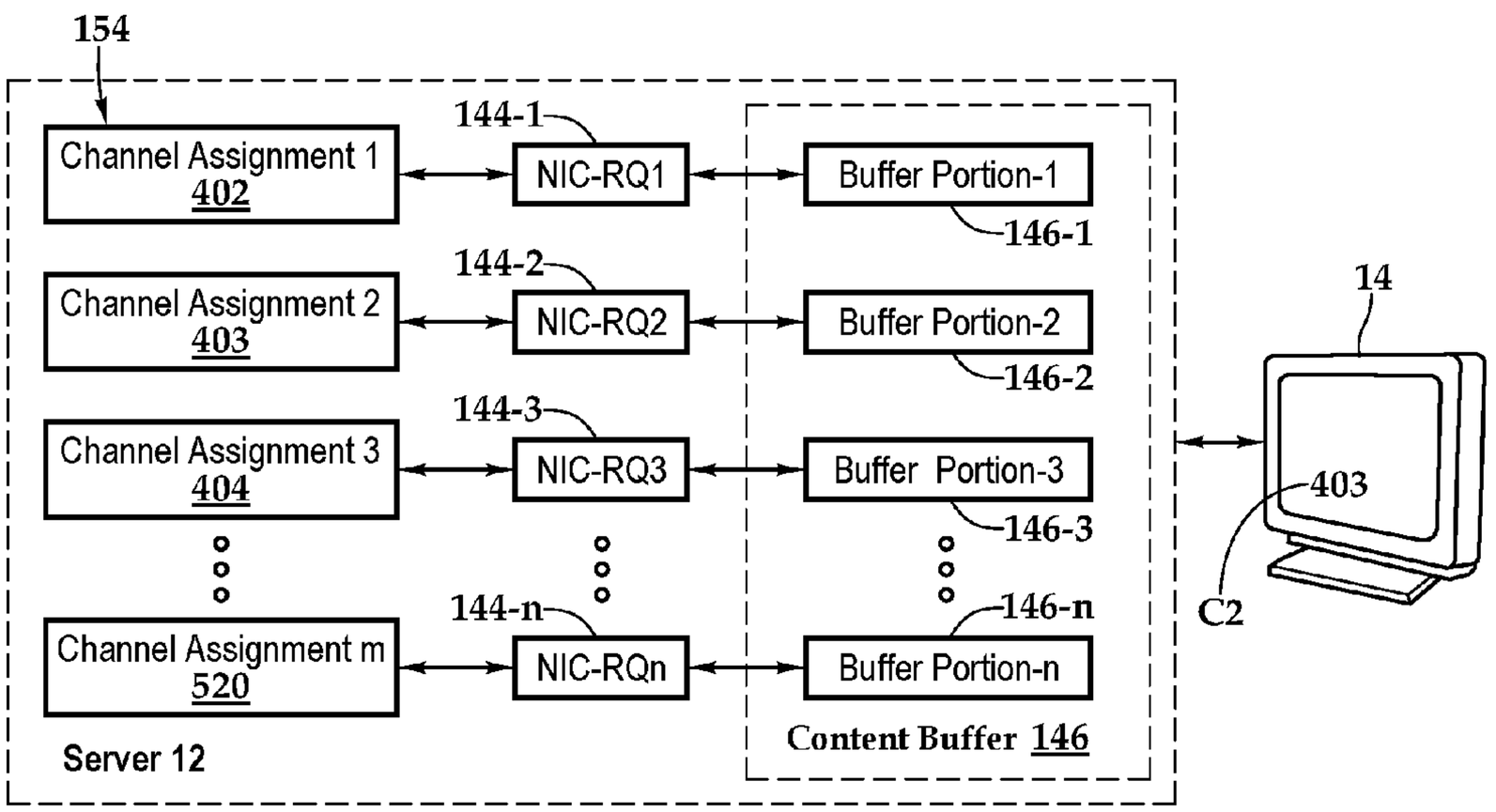
(57) **ABSTRACT**

A sever for providing television and system and method for use of the same are disclosed. In one embodiment, the server includes a network interface controller that is configured to receive a source internet protocol television signal, which includes two channels, from an external source and at least partially prepare the source internet protocol signal in order to forward the signal to a television. The server saves in a buffer the at least partially prepared second channel beginning at a recent periodic, sequential signal access point. In response to receiving a channel request instruction from a requesting television when the server is forwarding the at least partially prepared first channel signal, the server forwards the at least partially prepared signal based on the second channel stored in the buffer beginning at the recent periodic, sequential signal access point.

20 Claims, 4 Drawing Sheets



Related U.S. Application Data

which is a continuation-in-part of application No. 14/811,585, filed on Jul. 28, 2015, now abandoned.

(60) Provisional application No. 62/416,772, filed on Nov. 3, 2016, provisional application No. 62/029,781, filed on Jul. 28, 2014.

(51) **Int. Cl.**
H04N 21/438 (2011.01)
H04N 5/50 (2006.01)

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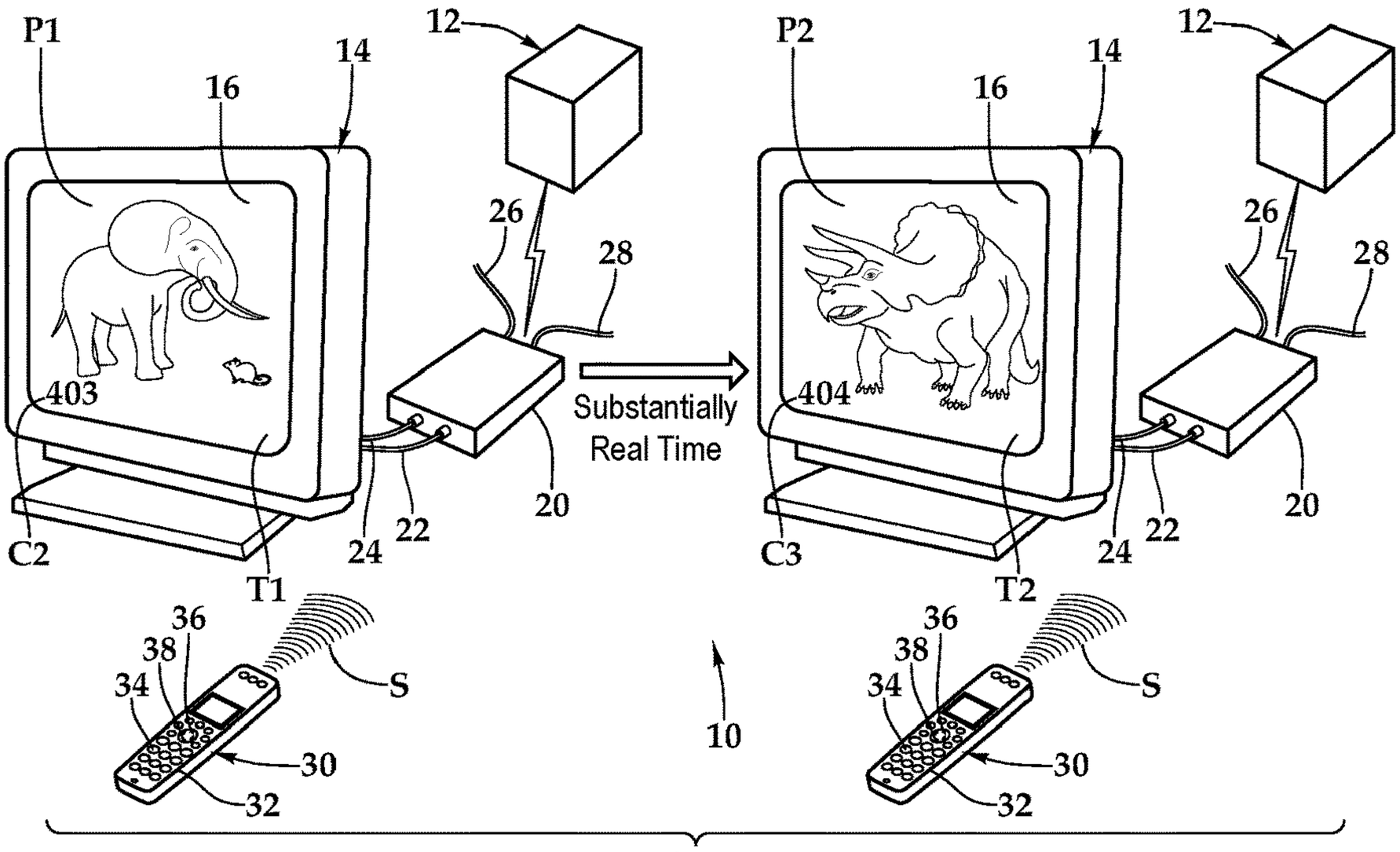

Fig.1

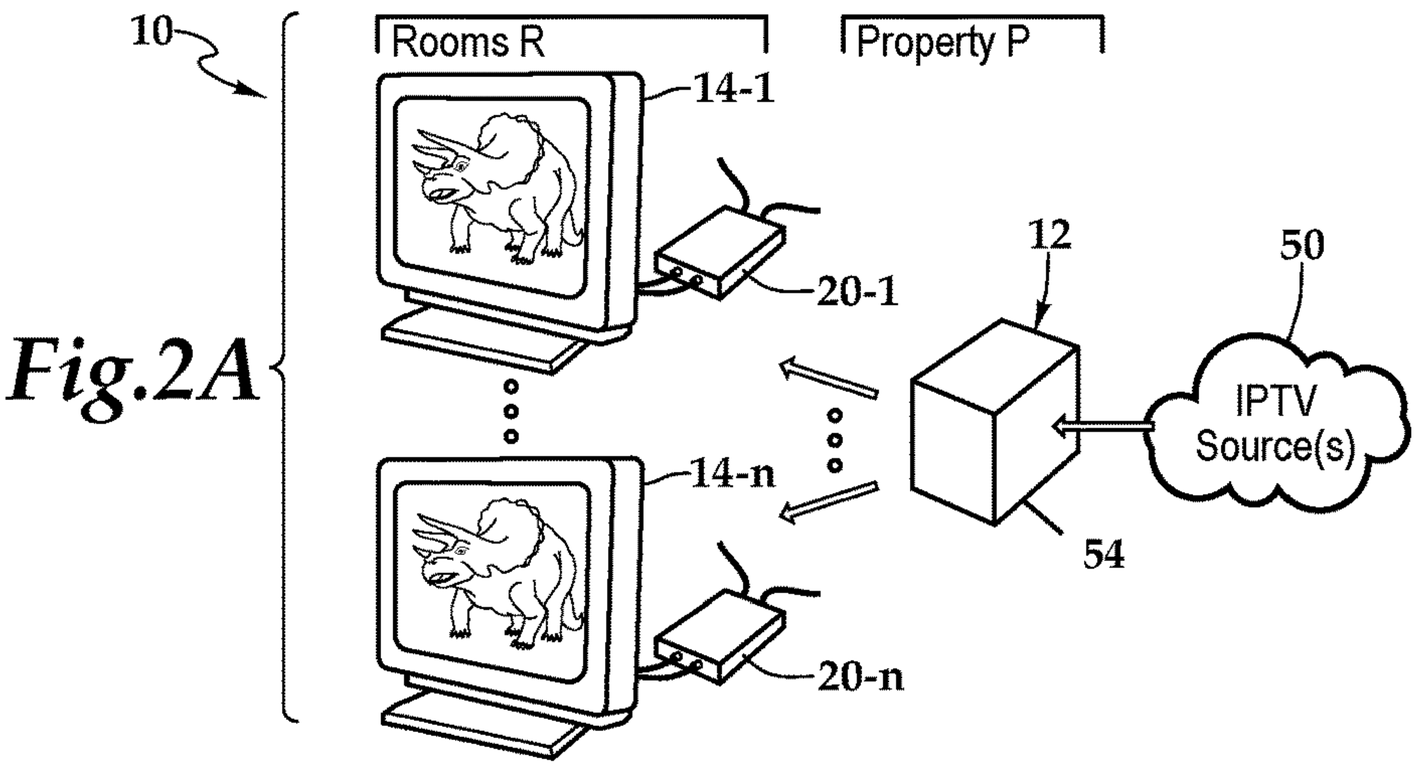

Fig.2A

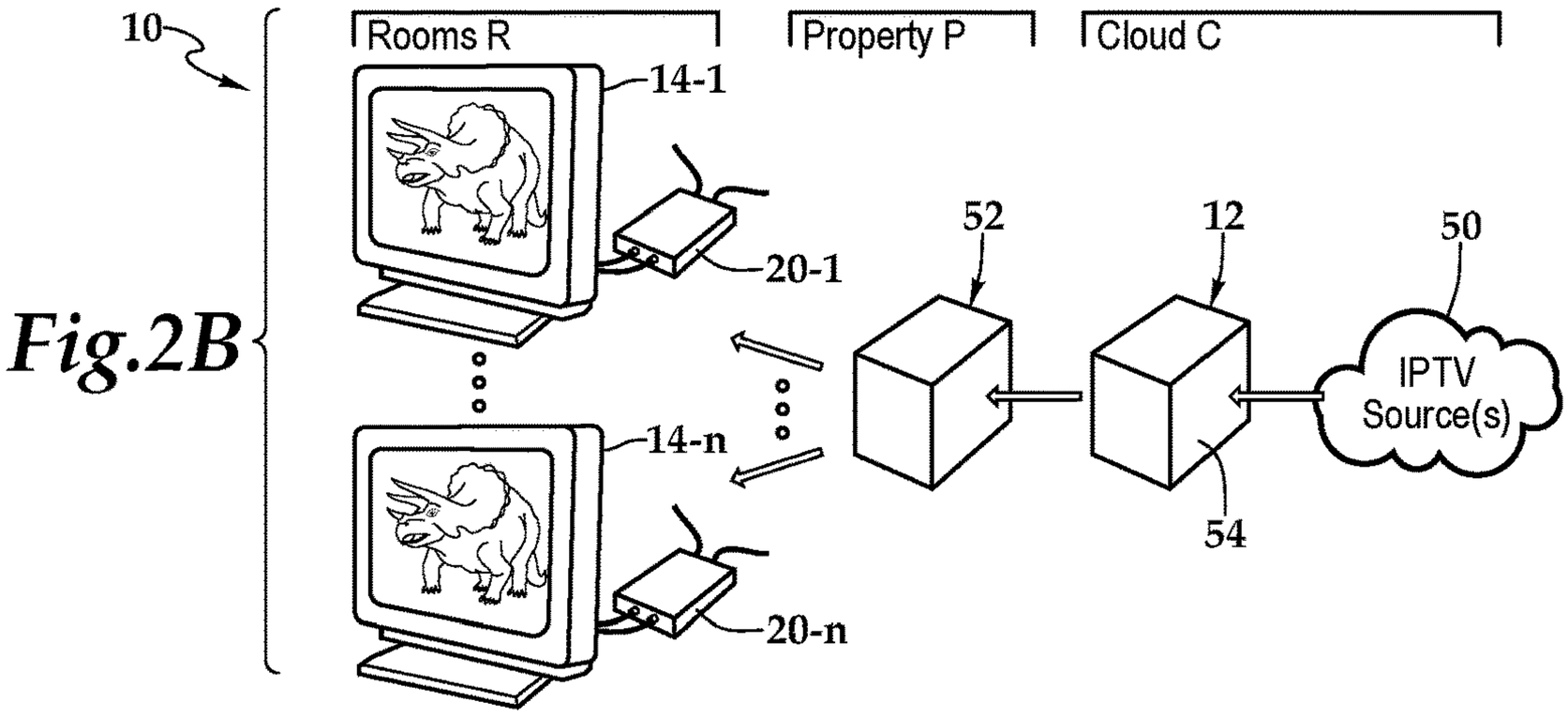

Fig.2B

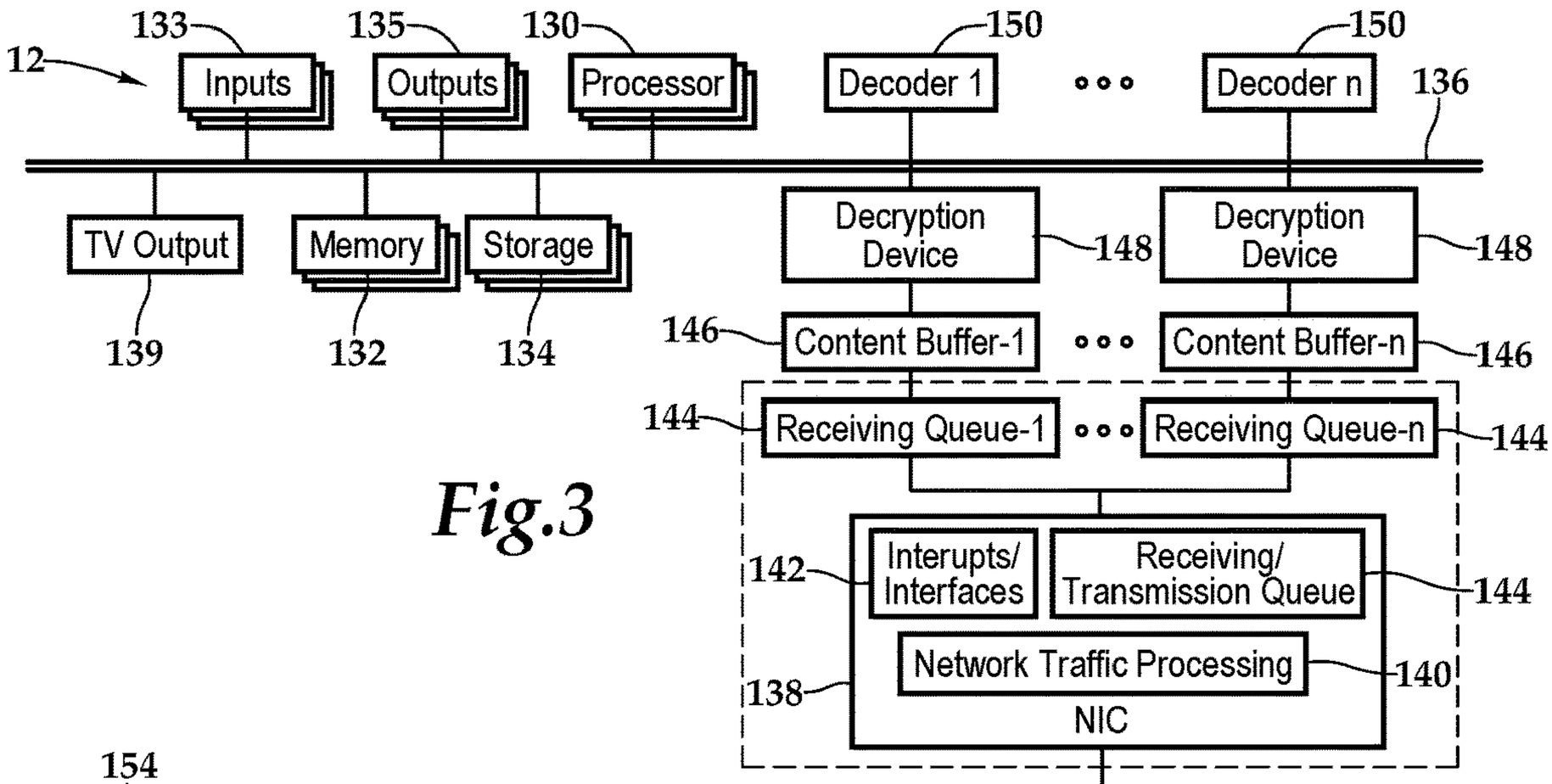

Fig.3

Fig.4A

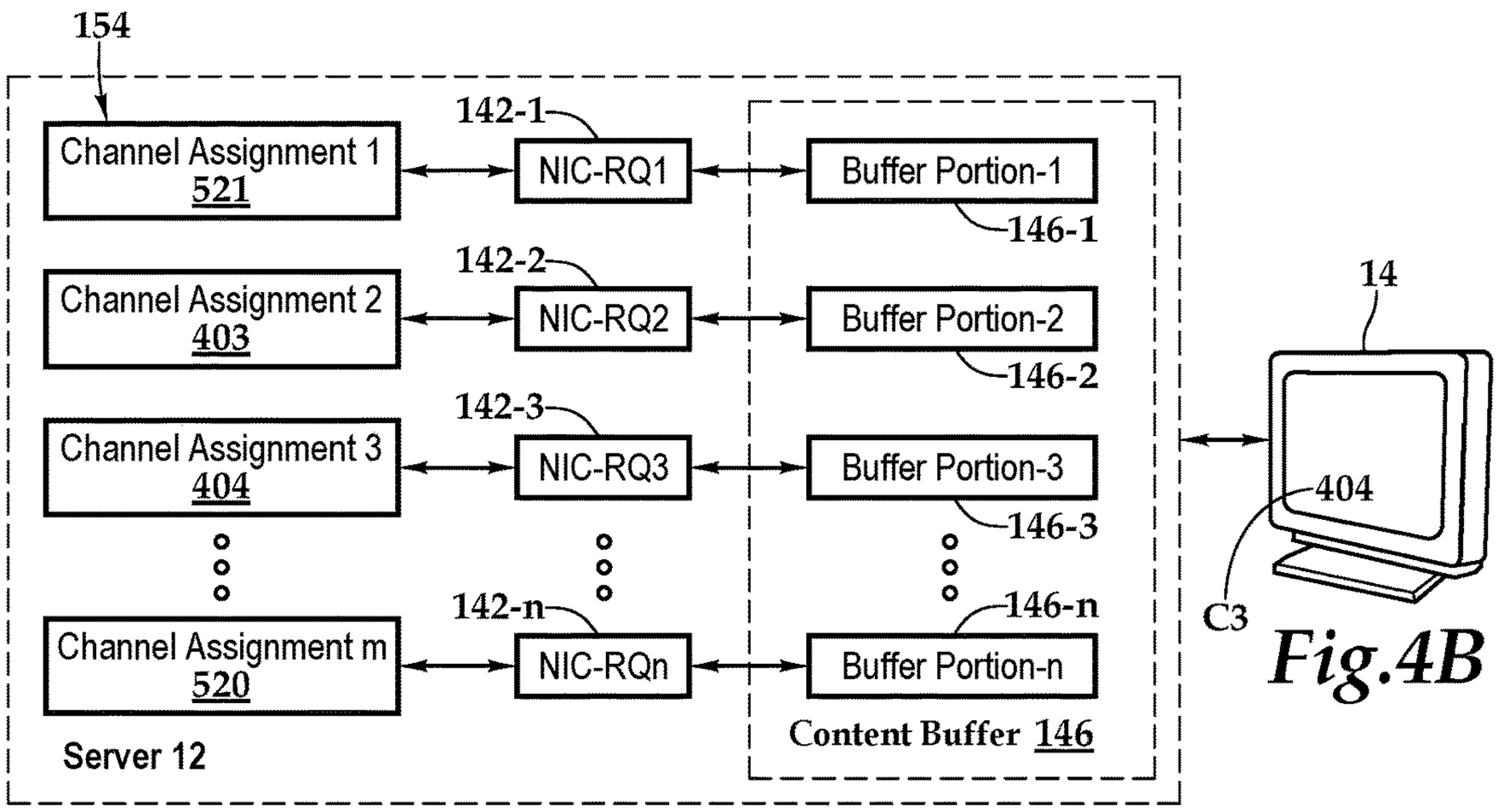

Fig.4B

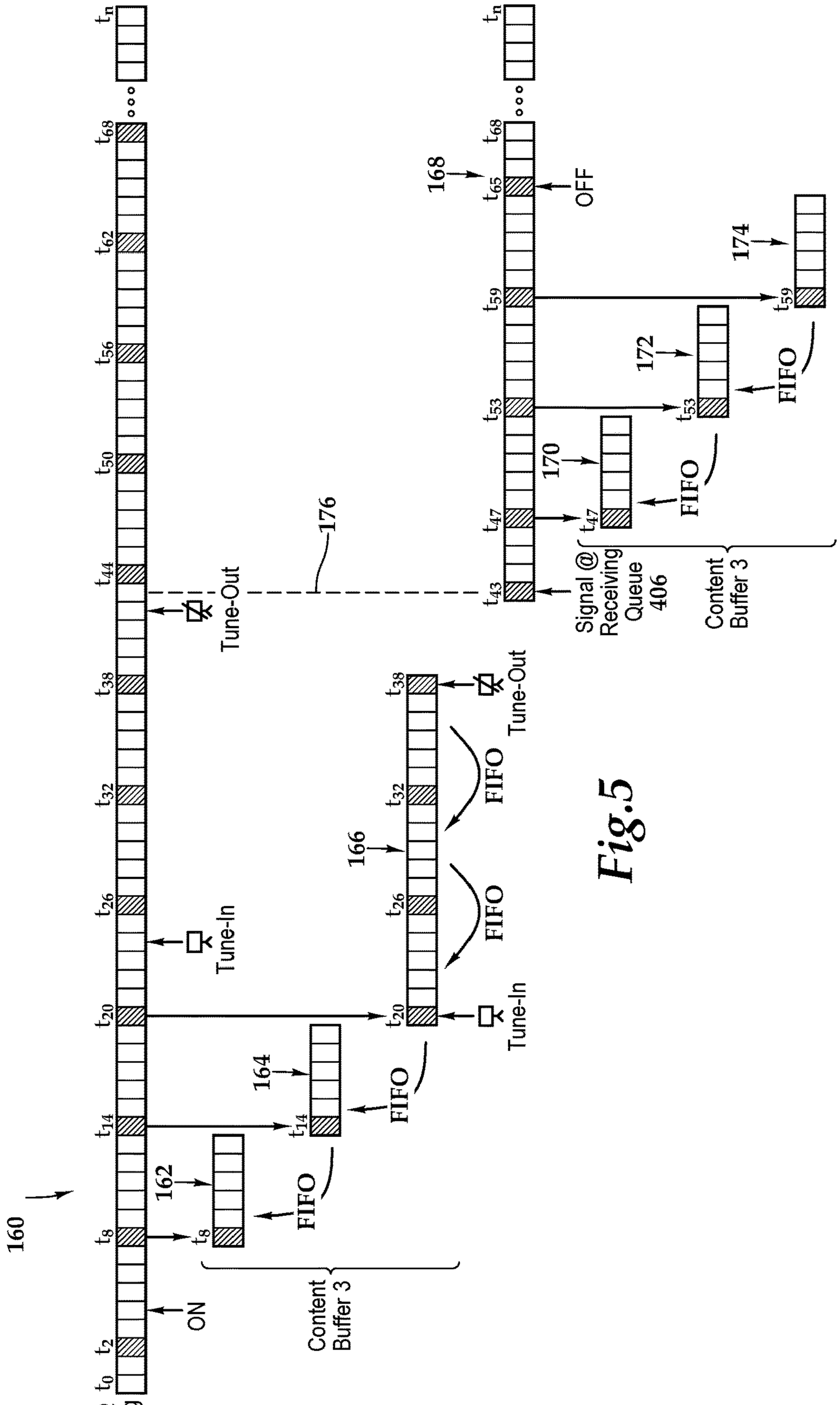
160
Signal @ Receiving Queue 404
Content Buffer 3
ON
Tune-In
Tune-Out
FIFO
162
164
166
168
170
172
174
176
OFF
Signal @ Receiving Queue 406
Content Buffer 3

Fig.5

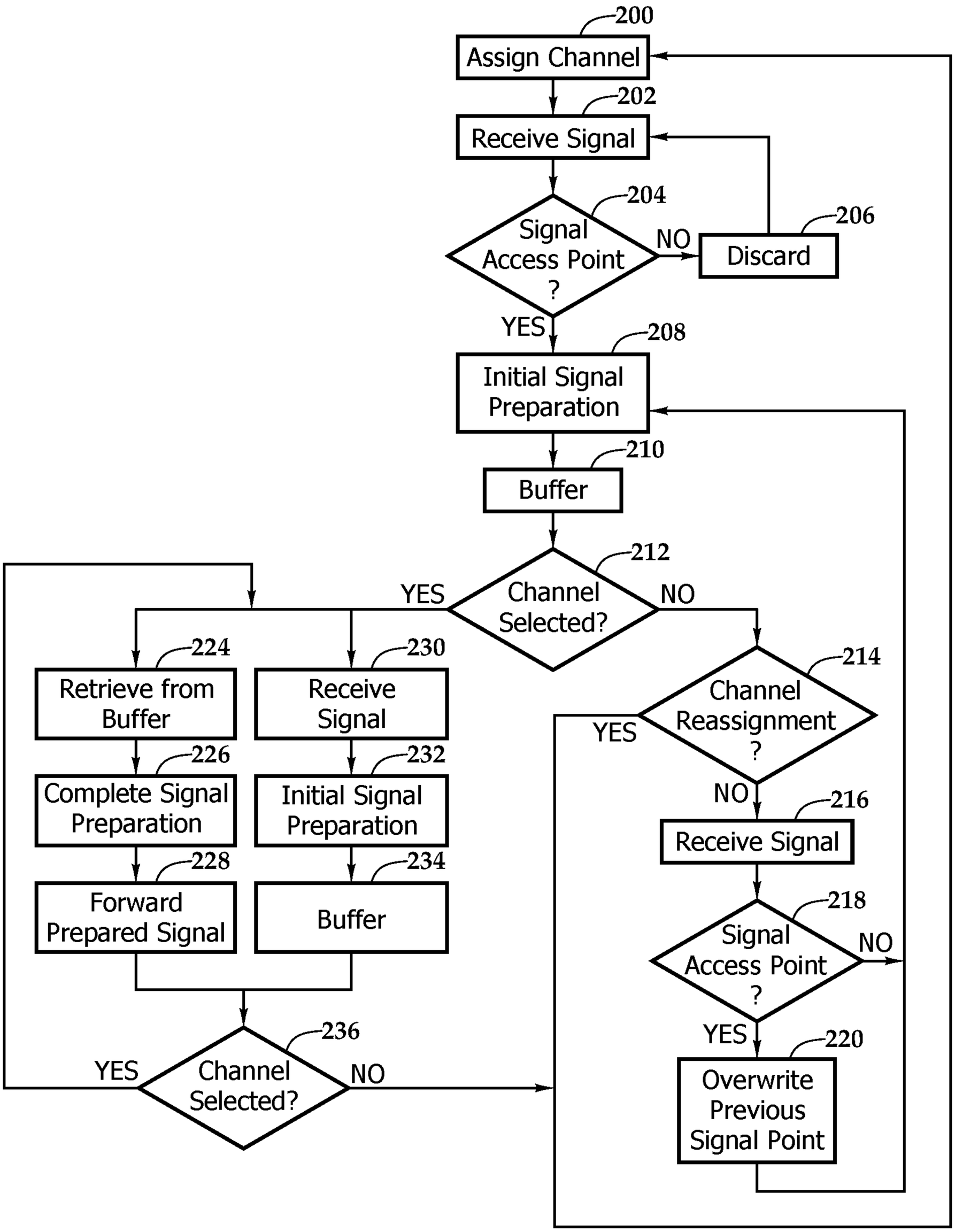
200
Assign Channel
202
Receive Signal
204
Signal Access Point ?
NO
206
Discard
YES
208
Initial Signal Preparation
210
Buffer
212
Channel Selected?
YES
NO
224
Retrieve from Buffer
226
Complete Signal Preparation
228
Forward Prepared Signal
230
Receive Signal
232
Initial Signal Preparation
234
Buffer
236
Channel Selected?
YES
NO
214
Channel Reassignment ?
YES
NO
216
Receive Signal
218
Signal Access Point ?
NO
YES
220
Overwrite Previous Signal Point

Fig.6

SERVER FOR PROVIDING TELEVISION AND SYSTEM AND METHOD FOR USE OF SAME

PRIORITY STATEMENT & CROSS-REFERENCE TO RELATED APPLICATIONS

This application is a continuation of U.S. application Ser. No. 15/693,821, entitled "Server for Providing Television and System and Method for Use of Same," filed Sep. 1, 2017, and issued on Mar. 17, 2020 as U.S. Pat. No. 10,595,074, in the names of Raymond S. Horton et al; which claims priority from U.S. Application Ser. No. 62/416,772, entitled "Server for Providing Television and System and Method for Use of Same" and filed on Nov. 3, 2016, in the names of Raymond S. Horton et al; both of which are hereby incorporated by reference, in entirety, for all purposes. U.S. application Ser. No. 15/693,821, now U.S. Pat. No. 10,595,074 is also a continuation-in-part of U.S. patent application Ser. No. 15/281,681, entitled "Set-Top Box for Changing Channels and System and Method for Use of Same," and filed on Sep. 30, 2016, and issued on Jan. 28, 2020, as U.S. Pat. No. 10,547,904, in the names of Raymond S. Horton et al; which is a continuation-in-part of U.S. application Ser. No. 14/811,585, entitled "Set-Top Box for Changing Channels and System and Method for Use of Same" and filed on Jul. 28, 2015, in the names of Raymond S. Horton et al.; which claims priority from U.S. Patent Application No. 62/029,781, entitled "Set-Top Box for Changing Channels and System and Method for Use of Same" and filed on Jul. 28, 2014, in the name of Vanessa Ogle; all of which are hereby incorporated by reference, in entirety, for all purposes.

TECHNICAL FIELD OF THE INVENTION

This invention relates, in general, to servers for providing television and, in particular, to servers for providing television and systems and methods for use of the same that address the total duration of time from a channel change button being pressed to the new channel being displayed.

BACKGROUND OF THE INVENTION

Without limiting the scope of the present invention, the background will be described in relation to televisions in the hospitality lodging industry, as an example. "Zap time" is the total duration of time from a television viewer pressing the channel change button, to the picture of the new channel being displayed with full resolution, along with corresponding audio. Zap time delays exist in all television systems, due to network factors, acquisition factors and buffering/decoding, for example. Zap time is greater in digital televisions, however, which are very common in hotels and other hospitality lodging establishments. As a result of limitations in existing technology, zap time is a frequent complaint and source of aggravation by guests staying in hospitality lodging establishments. Accordingly, there is a need for improved systems and methods for mitigating zap time delays.

SUMMARY OF THE INVENTION

It would be advantageous to reduce zap time in hospitality lodging establishments as well as any television viewing environment. It would also be desirable to enable a computer-based solution that would mitigate tuning-related factors, such as buffering and decryption delays. To better address one or more of these concerns, a server for providing television and system and method for use of the same are disclosed. In one embodiment of the server, the server includes a network interface controller that is configured to receive a source internet protocol television signal, which includes two channels, from an external source and at least partially prepare the source internet protocol signal in order to forward the signal to a television. The server saves in a buffer the at least partially prepared second channel beginning at a recent periodic, sequential signal access point. In response to receiving a channel request instruction from a requesting television when the server is forwarding the at least partially prepared first channel signal, the server forwards the at least partially prepared signal based on the second channel stored in the buffer beginning at the recent periodic, sequential signal access point. These and other aspects of the invention will be apparent from and elucidated with reference to the embodiments described hereinafter.

BRIEF DESCRIPTION OF THE DRAWINGS

For a more complete understanding of the features and advantages of the present invention, reference is now made to the detailed description of the invention along with the accompanying figures in which corresponding numerals in the different figures refer to corresponding parts and in which:

FIG. **1** is schematic diagram depicting one embodiment of a system for changing channels on a television according to the teachings presented herein;

FIG. **2**A is a schematic diagram depicting one embodiment of the system of FIG. **1** deployed in a co-located arrangement;

FIG. **2**B is a schematic diagram depicting one embodiment of the system of FIG. **1** deployed in a remote arrangement;

FIG. **3** is a functional block diagram depicting one embodiment of the server presented in FIGS. **2**A and **2**B;

FIG. **4**A is a functional block diagram depicting one embodiment of a channel change operation, prior to the channel change;

FIG. **4**B is a functional block diagram depicting the channel change operation presented in FIG. **4**A, at the channel change;

FIG. **5** is a functional block diagram depicting one embodiment of the signal processing and storage allocation accompanying the change operation presented in FIG. **4**A and FIG. **4**B; and

FIG. **6** is a flow chart depicting one embodiment of a method for changing channels according to the teachings presented herein.

DETAILED DESCRIPTION OF THE INVENTION

While the making and using of various embodiments of the present invention are discussed in detail below, it should be appreciated that the present invention provides many applicable inventive concepts, which can be embodied in a wide variety of specific contexts. The specific embodiments discussed herein are merely illustrative of specific ways to make and use the invention, and do not delimit the scope of the present invention.

Referring initially to FIG. **1**, therein is depicted one embodiment of system for changing channels, which is schematically illustrated and designated **10**. As shown, the

system **10** includes a server **12** and a display illustrated as television **14** having a screen **16**. A set-top box **20** is depicted as being interposed between the server **12** and the television **14**. The set-top box **20** includes an HDMI connection **22**, a power cable **24** coupling the set-top box **12** to a power source, a coaxial cable **26** coupling the set-top box **20** to external cable source, and a category five (Cat 5) cable **28** coupling the set-top box **20** to an external source that is a source, such as the server **20**, of internet protocol television signal.

A television remote control **30** includes an array of buttons **32** for adjusting various settings such as television channel and volume. Among the array of buttons **32**, the television remote control **30** is depicted as including channel change buttons **34**, up channel change button **36**, and a down channel change button **38**. In one embodiment, the television remote control **30** may be a consumer infrared (IR) or other protocol, such as Bluetooth device configured as a small wireless handheld object that issues commands from a distance to the set-top box **20** in order to control the television **14** via the set-top box **20**, for example. It should be appreciated that although a set-top box **20** is depicted in FIG. **1**, the teachings presented herein are applicable to instances without set-top boxes and the server **12** may have a more direct connection with the television **14**.

In one implementation, as illustrated, channel **403**, as indicated by C**2**, is broadcasting a program, as indicated by T**1**, and this program T**1** is on the screen **16** of the television **14**. A user presses the up channel change button **36** on the television remote control **30** and a signal S, which includes instructions for the channel C**2** to be changed one channel upward, is transmitted from the television remote control **30** to the set-top box **20** and onto the server **12**. As shown in FIG. **1**, the channel is changed from channel **403** to channel **404**, as indicated by C**3**, with program T**2**. The channel change occurs in substantially real time with zap time being mitigated, as will be discussed in further detail hereinbelow. In one embodiment, the server **12** provides two-way communications with an internet protocol network to buffer and decode video streaming media received on the internet protocol television signal so that zap time is mitigated.

Referring now to FIG. **2**A, the system **10** may be deployed such that the server **12** is co-located on the property P with the televisions **14-1** . . . **14-***n* and the corresponding set-top boxes **20-1** . . . **20-***n*, with, in one embodiment, internet protocol television sources **50** providing sources of content. As shown, the server **12** includes a housing **54** having an internet protocol television output and other components therein.

Referring to FIG. **2**B, the system **10** may be deployed such that the server **12** is located remotely relative to televisions **14-1** . . . **14-***n*. In particular, the sever **12** may be located remotely relative to the televisions **14-1** . . . **14-***n* and any set-top boxes **20-1** . . . **20-***n* such that a property headend **52** is interposed between the server **12** and the televisions **14-1** . . . **14-***n*. As shown, in this implementation, the property headend **52** is co-located with the televisions **14-1** . . . **14-***n*. It should be appreciated that the server **12** may be located on a single property to serve one or more television thereon. Further, it should be appreciated that the server **12** may be remotely located to serve multiple properties having multiple televisions.

One embodiment of the server **24** as a computing device includes a processor **130**, memory **132**, storage **134**, inputs **133**, and outputs **135** interconnected with various buses **136** in a common or distributed, for example, mounting architecture. In other implementations, in the computing device, multiple processors and/or multiple buses may be used, as appropriate, along with multiple memories and types of memory. Further still, in other implementations, multiple computing devices may be provided and operations distributed therebetween. The processor **130** may process instructions for execution within the server **12**, including instructions stored in the memory **132** or in storage **134**. The memory **132** stores information within the computing device. In one implementation, the memory **132** is a volatile memory unit or units. In another implementation, the memory **132** is a non-volatile memory unit or units. Storage **134** includes capacity that is capable of providing mass storage for the server **12**. Various inputs **133** and outputs **135** provide connections to and from the server **12**, wherein the inputs **133** are the signals or data received by the server **12**, and the outputs **135** are the signals or data sent from the server **12**.

An internet protocol television input **137** is coupled to a network interface controller **138** and a television output **139** is also secured with the housing **50** of the server **12** in order to receive content from a source and forward the content, including external content such video on demand, live programming content, and pre-buffered content, to one or more televisions located within a hotel room or one or more television located in multiple hotel rooms, for example. More specifically, the network interface controller **138** receives a source internet protocol television signal from an external source. The source signal includes multiple channels and each of the multiple channels has periodic, sequential signal access points that permit tuning initiation. The network interface controller **138** is configured to receive and tune multiple channels from the source internet protocol television signal. As shown, the network interface controller **138** includes network traffic processing **140**, interrupts/interfaces **142** and receiving transmission/queues **144**. The network controller interface **138** implements the electronic circuitry required to communicate using a specific physical layer and data link layer standard. This provides a base for a full network protocol stack with network traffic processing capabilities, allowing communication with computers or servers on a local area network or large-scale network communications through routable protocols, such as Internet Protocol (IP). The network interface controller may enable communication, either by using cables or wirelessly.

A content buffer **146** associated with a decryption device **148** and a decoder **150** is also included in order to provide at least a partially prepared channel. The contact buffer **146** stores the signal and may be independent storage or associated with or form a portion of the memory **132** or storage **134**. In one embodiment, the content buffer **146** may be a first-in-first-out (FIFO) buffer, having one per tuner, in the memory. The content buffer **146** may hold at least one access point for the incurring signal streams when the buffer is assigned to the correct viewing channel, the processor may quickly jump to the access point in the buffer and start the content decryption and decoding process. The decryption device **148** then decrypts the demodulated signal before decoding at the decoder **150**. It should be appreciated that although a particular architecture of network interface controller **138**, decryption device and decoder is depicted, other architectures are within the teachings presented herein.

The memory **132** and storage **134** are accessible to the processor **130** and include processor-executable instructions that, when executed, cause the processor **130** to execute a series of operations. In one embodiment, the processor-executable instructions dynamically assign each of the receiving queues (e.g., receiving queue-1 through receiving

queue-n) to one of channels. An associated content buffer **146** (e.g., content buffer-1 through content-buffer-n) may likewise also be assigned to one of the channels. The processor-executable instructions provide two-way communications with the internet protocol network communicating with the network interface controller **138** and decode the video streaming media received on the internet protocol television signal. The processor-executable instructions buffer in the content buffer **146** the at least partially prepared second channel signal and track in the content buffer **146** the at least partially prepared second channel signal beginning at a recent periodic, sequential signal access point. In response to receiving a channel change instruction, the buffer is accessed to the at least partially prepared second channel signal beginning at the recent periodic, sequential signal access point. The processor-executable instructions then transform the partially prepared second channel signal to a at least partially processed second channel signal, which may be a fully prepared second channel signal, and forward, via the television output, the partially processed second channel signal. Transforming or processing the at least partially prepared channel to be at least partially processed channel, including a fully tuned channel, may involve use of the decryption device **148** and the decoder **150**, for example.

Referring now to FIGS. **4**A and **4**B, wherein one embodiment of a channel change operation is depicted in additional detail. As shown, in FIG. **4**A, channel assignments **154** are made for each receiving queue **144** associated with the network interface controller **138**, including NIC-RQ1 (**144-1**), NIC-RQ2 (**144-2**), NIC-RQ3 (**144-3**), through NIC-RQn (**144-*n***). More specifically, the receiving queues **144-1** through **144-*n*** are assigned channels **402**, **403**, **404**, and **520**, respectively. It should be appreciated that the number of channels m may be much greater than the number of receiving queues n, such that m>>n. Further, each receiving queue **144** is assigned a buffer portion **146-1**, **146-2**, **146-3**, through **146-*n***, of content buffer **146**. As each tuner receives a channel of the source signal, the channel is at least partially tuned and stored at the respective buffer portion. By way of example, receiving queue-1 is tuned to channel **402** and partially prepares this channel and stores the at least partially prepared channel in buffer portion **1**.

As depicted, the television **14** is presently configured for viewing channel **403**. At FIG. **4**B, the channel is changed from "**403**" to "**404**" and, accordingly, the at least partially prepared channel at the buffer portion associated with tuner **3**, which is assigned to channel **404** is accessed. The signal is then at least partially prepared or fully prepared and provided to the television **14**. By having the channel already partially prepared, the zap time or delay associated with changing channels is minimized.

Referring now to FIG. **5**, wherein one embodiment of the signal processing and storage allocation accompanying the change operation presented in FIG. **4**A and FIG. **4**B is further illustrated. A signal **160**, which corresponds to channel **404**, is receivable by the set-top box and, as shown, begins at time t_0 and continues to time t_n. As illustrated, receiving queue 3 receives signal **160** beginning at time t_4 upon the television tuning capability being turned ON at the set-top box or television, for example. Periodic, sequential signal access points are positioned within the signal **160** at various times, including t_2, t_8, t_{14}, t_{20}, t_{26}, t_{32}, and continuing with the spacing of 6 second increments between sequential signal access points. As alluded, each of the periodic, sequential signal access points provides a location at which processing and preparation of the signal may begin. Processing and preparation may include receiving, buffering, decryption, and decoding, for example.

With respect to the signal **160**, beginning at time t_8 with the sequential signal access point thereat, the set-top box buffers in the buffer portion **3** the at least partially tuned channel **160** as signal portion **162** in the buffer portion **3**. As shown, in one embodiment, the buffering of the signals occurs in a first-in-first-out (FIFO) manner. As previously discussed, buffer portion **3** continues to keep signal portions, including tacking and identification thereof, beginning at periodic, sequential signal access points until the channel **404** is selected for viewing. By way of example, buffer portion **3** stores a signal portion **164** beginning at time t_{14} and continuing until time t_{19}. Further, signal portion **166** is stored in buffer portion **3** beginning with the sequential signal access point at time t_{20} and preliminary preparation performed on the signal portion **166**.

The set-top box tracks in the storage and buffering the at least partially prepared channel **160** beginning at a recent periodic, sequential signal access point, such as periodic sequential signal access points t_8, t_{14}, and t_{20}, with the periodic sequential signal access point t_{20} being the recent periodic sequential signal access point upon the set-top box receiving a signal to tune-in to the channel represented by the signal **160** at time t_{24}. At time t_{24}, the set-top box in response to receiving a channel change instruction, accesses from the buffer portion **3** the at least partially tuned channel **160** beginning at the recent periodic, sequential signal access point at time t_{20}. Thereafter, the set-top box transforms the partially tuned channel **160** to a partially processed channel signal, which may be a fully tuned channel signal, and forwards, via the television output, the at least partially processed channel signal to the television.

That is, in the illustrated embodiment, at time t_{24} the set-top box is tuned-in to channel **404**. Thereafter, the set-top box accesses the signal portion **166** stored in buffer portion **3** that the set-top box was tracking. At the time t_{24}, the set-top box retrieves the partially prepared signal at time t_{20} in the buffer portion **3** and may then complete the tuning. The set-top box then forwards the partially processed signal, which may include a fully prepared signal, beginning at time t_{20} to the display or television. The set-top box continues to receive and perform a preliminary signal preparation on the signal **160**, with storage and buffering of signal portion **166**. Further, the set-top box continues to retrieve, perform a secondary signal preparation on the signal portion, and forward the fully prepared signal through time t_{42}, which corresponds to time t_{38} in the signal portion **166**. At time t_{42}, channel **404** is tuned-out, due to a channel change or other event, as indicated by line **176**.

As shown, at time t_{43}, the buffer portion is assigned to channel **406** and signal **168** is received. Within the signal **168**, signal access points are at times t_{43}, t_{47}, t_{53}, t_{59} and so on. Accordingly, signal portions **170**, **172**, and **174** are sequentially stored, buffered, and preliminary prepared at signal portion **3** in preparation for channel **406** being accessed for viewing by the set-top box. It should be appreciated that although only a single buffer portion is depicted in FIG. **5**, multiple buffer portions are within the teachings presented herein and the assignment of channels to the buffer portions may be based various schemes, including storing and pre-preparing the channel corresponding to the "channel-up" button, the "channel-down" button, a channel two "channel-up" button executions away, or a frequently viewed channel, by way of example.

FIG. **6** illustrates one embodiment of a method for changing channels according to the teachings presented herein. At

block **200**, channel assignments are made to buffer portions of the set-top box. Continuing the description of the methodology with respect to a single channel assignment made to a buffer portion of the set-top box, at block **202**, the set-top box receives a signal that is assigned for storage and buffer per block **200**. At this step, some preparation or processing may occur as well. At decision block **204**, if the portion of the signal received is not a signal access point, then at block **206**, the signal is discarded and the methodology returns to block **202**. On the other hand, if the portion of the signal received includes a signal access point, then the methodology advances to block **208** where initial signal preparation, including primary preparation of the signal may occur. In one implementation, the primary preparation may include a portion of receiving, demodulation, decryption, and decoding. Following the primary preparation, the portion of the signal is buffered in the storage at block **210**.

At decision block **212**, if the channel is not selected for viewing on the television or display associated with the set-top box, then the methodology advances to decision block **214**, where if the storage portion is assigned a new channel, the method returns to block **200**. Otherwise, if the storage has not been reassigned a channel, the methodology advances to block **216** where additional signal is received and, if the signal is a signal access point, as shown at decision block **218**, then at block **220**, the previously stored signal portion associated with the previously most recent signal access point is subject to an overwrite prior to the methodology returning to block **208** to conduct a primary tuning on the signal access point prior to storage.

Returning to decision block **218**, if the signal portion received is not a signal access point, then the methodology returns to blocks **208** and **210** to execute primary preparation on the signal portion and store the newly received signal portion with previously received the signal portion or portions associated with the recent signal access point.

Returning to decision block **212**, if the channel is selected for display on the television associated with the set-top box, then the methodology advances to two processes conducted in parallel. First, at block **224**, the signal is retrieved from buffering so that signal preparation may be completed, including secondary preparation occurring at block **226** following by forwarding of the signal to the television or display at block **228**. In one implementation, the secondary preparation may include the portion of receiving, demodulation, decryption, and decoding not performed during the primary tuning. By retrieving utilizing a partially prepared signal to complete tuning, delays associated with zap time are mitigated. In one embodiment, receiving queues and content buffers not used by the viewing channels are fully prepared and receiving demodulated video and audio streamed. The processor continuously tracks the location of each access point in each buffer. In this implementation, decryption does not occur until the content buffer is assigned as the viewing channel.

In parallel to the operations in blocks **224**, **226**, and **228**, at blocks **230**, **232**, and **234**, a signal is received, primary signal preparation occurs, and the signal is buffered. Following the operations in blocks **224-228** and blocks **230-234**, the methodology advances to decision block **236**, where if the channel remains selected, the methodology returns to blocks **224-228** and blocks **230-234**. Otherwise, the methodology returns to the channel assignment at block **200**.

The order of execution or performance of the methods and data flows illustrated and described herein is not essential, unless otherwise specified. That is, elements of the methods and data flows may be performed in any order, unless otherwise specified, and that the methods may include more or less elements than those disclosed herein. For example, it is contemplated that executing or performing a particular element before, contemporaneously with, or after another element are all possible sequences of execution.

While this invention has been described with reference to illustrative embodiments, this description is not intended to be construed in a limiting sense. Various modifications and combinations of the illustrative embodiments as well as other embodiments of the invention, will be apparent to persons skilled in the art upon reference to the description. It is, therefore, intended that the appended claims encompass any such modifications or embodiments.

What is claimed is:

1. A server for providing television comprising:

a housing securing a processor, memory, buffer, and a network interface controller therein;

a busing architecture communicatively interconnecting the processor, the memory, the buffer, and the network interface controller therebetween;

the busing architecture communicatively interconnecting the network interface controller to a plurality of receiving queues, each of the plurality of receiving queues having a respective content buffer, a respective decryption device, and a respective decoder;

the network interface controller configured to receive a source internet protocol television signal from an external source, the source internet protocol television signal including a plurality of channels, each of the plurality of channels having periodic, sequential signal access points that permit tuning initiation;

the network interface controller receiving the plurality of channels simultaneously, each of the plurality of channels of the source internet protocol television signal being assigned to one of the plurality of receiving queues;

the network interface controller configured to receive and at least partially prepare a first channel from the plurality of channels of the source internet protocol television signal, the network interface controller providing an at least partially prepared first channel signal;

the network interface controller configured to receive and at least partially prepare a second channel from the plurality of channels of the source internet protocol television signal, the network interface controller providing an at least partially prepared second channel signal;

the network interface controller being fully enabled to start simultaneous decryption and decoding of the first channel and the second channel; and

the memory accessible to the processor, the memory including processor-executable instructions that, when executed, cause the processor to:

buffer in the buffer the at least partially prepared second channel signal,

track in the buffer, the at least partially prepared second channel signal beginning at a recent, periodic, sequential signal access point,

in response to receiving a channel request instruction from a requesting television, access from the buffer, the at least partially prepared second channel signal beginning at the recent, periodic, sequential signal access point, and

transform the at least partially prepared second channel signal to be an at least partially processed second channel signal.

2. The server as recited in claim 1, wherein the server is located in communication with a property headend co-located with a plurality of televisions.

3. The server as recited in claim 1, wherein the at least partially prepared second channel signal comprises a fully prepared second channel signal.

4. The server as recited in claim 1, wherein the at least partially processed second channel signal comprises a fully prepared second channel signal.

5. The sever as recited in claim 1, wherein the network interface controller further comprises circuitry providing a full network protocol stack with network traffic processing capabilities.

6. The server as recited in claim 1, wherein the internet protocol television signal further comprises an internet protocol suite over a packet-switched network.

7. The server as recited in claim 1, wherein the first channel comprises video on demand.

8. The server as recited in claim 1, wherein the first channel comprises live programming content.

9. The server as recited in claim 1, wherein the first channel comprises pre-buffered content.

10. The server as recited in claim 1, wherein the network interface controller is dynamically assigned a channel.

11. The server as recited in claim 1, wherein the network interface controller is assigned a channel frequently tuned.

12. The server as recited in claim 1, wherein the processor-executable instructions to track in the buffer, the at least partially prepared second channel beginning at the recent, periodic, sequential signal access point further comprise processor-executable instructions causing the processor to track in the buffer, the at least partially prepared second channel beginning at a most recent, periodic, sequential signal access point.

13. The server as recited in claim 1, wherein the processor-executable instructions to track in the buffer, the at least partially prepared second channel beginning at the recent, periodic, sequential signal access point further comprise processor-executable instructions causing the processor to:

track in the buffer, the at least partially prepared second channel beginning at a first periodic, sequential signal access point; and

track in the buffer, the at least partially prepared second channel beginning at a second periodic, sequential signal access point, the second periodic, sequential signal access point being subsequent in time to the first periodic, sequential signal access point.

14. The server as recited in claim 12, wherein the processor-executable instructions to track in the buffer, the at least partially prepared second channel beginning at the recent, periodic, sequential signal access point further comprise processor-executable instructions causing the processor to:

make available for deletion a portion of the buffered, at least partially prepared second channel in the buffer previous to the most recent, periodic, sequential signal access point.

15. The server as recited in claim 12, wherein the processor-executable instructions to track in the buffer, the at least partially prepared second channel beginning at the recent, periodic, sequential signal access point further comprise processor-executable instructions causing the processor to:

make available for over-write the portion of the buffered, at least partially prepared second channel in the buffer previous to the most recent, periodic, sequential signal access point.

16. A server for providing television comprising:

a housing securing a processor, memory, buffer, and a network interface controller therein;

a busing architecture communicatively interconnecting the processor, the memory, the buffer, and the network interface controller therebetween;

the busing architecture communicatively interconnecting the network interface controller to a plurality of receiving queues, each of the plurality of receiving queues having a respective content buffer, a respective decryption device, and a respective decoder;

the network interface controller configured to receive a source internet protocol television signal from an external source, the source internet protocol television signal including a plurality of channels, each of the plurality of channels having periodic, sequential signal access points that permit tuning initiation;

the network interface controller receiving the plurality of channels simultaneously, each of the plurality of channels of the source internet protocol television signal being assigned to one of the plurality of receiving queues;

the network interface controller including circuitry providing a full network protocol stack with network traffic processing capabilities;

the network interface controller configured to receive and at least partially prepare a first channel from the plurality of channels of the source internet protocol television signal, the network interface controller providing an at least partially prepared first channel signal;

the network interface controller configured to receive and at least partially prepare a second channel from the plurality of channels of the source internet protocol television signal, the network interface controller providing an at least partially prepared second channel signal;

the network interface controller being fully enabled to start simultaneous decryption and decoding of the first channel and the second channel; and

the memory accessible to the processor, the memory including processor-executable instructions that, when executed, cause the processor to:

buffer in the buffer the at least partially prepared second channel signal,

track in the buffer, the at least partially prepared second channel signal beginning at a recent periodic, sequential signal access point,

in response to receiving a channel request instruction from a requesting television of the plurality of televisions, access from the buffer, the at least partially prepared second channel signal beginning at the recent periodic, sequential signal access point, and

transform the buffered, at least partially prepared second channel signal to be an at least partially processed second channel signal.

17. The server as recited in claim 16, wherein the first channel comprises video on demand.

18. The server as recited in claim 16, wherein the first channel comprises live programming content.

19. The server as recited in claim 16, wherein the first channel comprises pre-buffered content.

20. A server for providing television comprising:

a housing securing a processor, memory, buffer, and a network interface controller therein;

a busing architecture communicatively interconnecting the processor, the memory, the buffer, and the network interface controller therebetween;

the busing architecture communicatively interconnecting the network interface controller to a plurality of receiving queues, each of the plurality of receiving queues having a respective content buffer, a respective decryption device, and a respective decoder;

the network interface controller configured to receive a source internet protocol television signal from an external source as video streaming media, the source internet protocol television signal including a plurality of channels, each of the plurality of channels having periodic, sequential signal access points that permit tuning initiation;

the network interface controller receiving the plurality of channels simultaneously, each of the plurality of channels of the source internet protocol television signal being assigned to one of the plurality of receiving queues;

the network interface controller including circuitry providing a full network protocol stack with network traffic processing capabilities;

the network interface controller configured to receive and at least partially prepare a first channel from the plurality of channels of the source internet protocol television signal, the network interface controller providing an at least partially prepared first channel signal;

the network interface controller configured to receive and at least partially prepare a second channel from the plurality of channels of the source internet protocol television signal, the network interface controller providing an at least partially prepared second channel signal;

the network interface controller being fully enabled to start simultaneous decryption and decoding of the first channel and the second channel; and

the memory accessible to the processor, the memory including processor-executable instructions that, when executed, cause the processor to:

provide two-way communications with an internet protocol network communicating with the network interface controller,

decode the video streaming media received on the internet protocol television signal,

buffer in the buffer the at least partially prepared second channel signal,

track in the buffer, the at least partially prepared second channel signal beginning at a recent periodic, sequential signal access point,

in response to receiving a channel request instruction from a requesting television of a plurality of televisions, access from the buffer, the at least partially prepared second channel signal beginning at the recent periodic, sequential signal access point, and

transform the buffered, at least partially prepared second channel signal to be an at least partially processed second channel signal.

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